Group Exam 4

Math 142

Fall 2005

Name: _____

Name of group member: _____

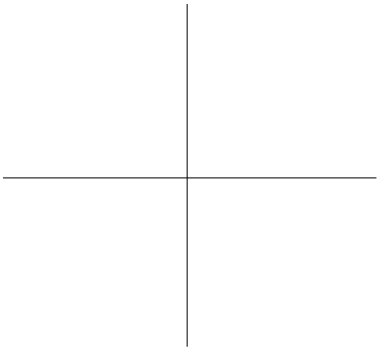
Name of group member: _____

Problem 1: (a) Consider the parametric curve: $\begin{cases} x &= 6 - 3t^2 \\ y &= t^3 - 12t \end{cases}$

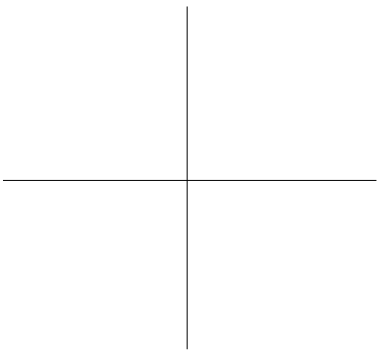
Find $\frac{dy}{dx}$ and determine all points (x, y) where the tangent line to the curve is horizontal and all points (x, y) where the tangent line is vertical.

Dertermine the t-intervals over which the curve is increasing.

Use the information above to sketch the graph of this parametric curve in the space provided below. Label all points found above and indicate the direction of travel along the curve as t-increases.



(b) Sketch the graph of the parametric curve given below. [Notice the relationship between this curve and the curve in part (a).] $\begin{cases} x &= t^3 - 12t \\ y &= 6 - 3t^2 \end{cases}$



Signature line: _____ _____

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Problem 2: The figure below shows a telephone wire hanging between two poles at $x = -15$ and $x = 15$. The wire takes the shape of the curve $y = 10 + 15(e^{x/15} + e^{-x/15})$. Find the length of the wire between the poles.

Signature line: _____ _____

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Problem 3: (a) Consider the curve $y = \frac{1}{x^{0.9}}$. Find the area under this curve and above the interval $[3, \infty)$.

(b) Let $\mathcal{R}$ denote the region bounded by the curve $y = \frac{1}{x^{0.9}}$ and the line $y = 0$, for $x \geq 3$. Find the volume of the solid obtained by rotating this region about the x-axis.

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